Overview of
EO 13514 Implementing Instructions for Water Efficiency & Management

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Federal Water Policy Overview

Reduce Federal Water Use

EO 13423
2% annual potable water use intensity reduction – 16% by FY 2015

EO 13514
Extends EO 13423 through FY 2020; adds ILA* water use reduction

EISA 2007
25% of covered facilities will be evaluated for water and energy annually every 4 years

Agency SSPP**

2007 — 2009 — Present

*Industrial, landscaping and agricultural
**Strategic Sustainability Performance Plan

Slide from Kate McMordie-Stoughton GreenGov 2011

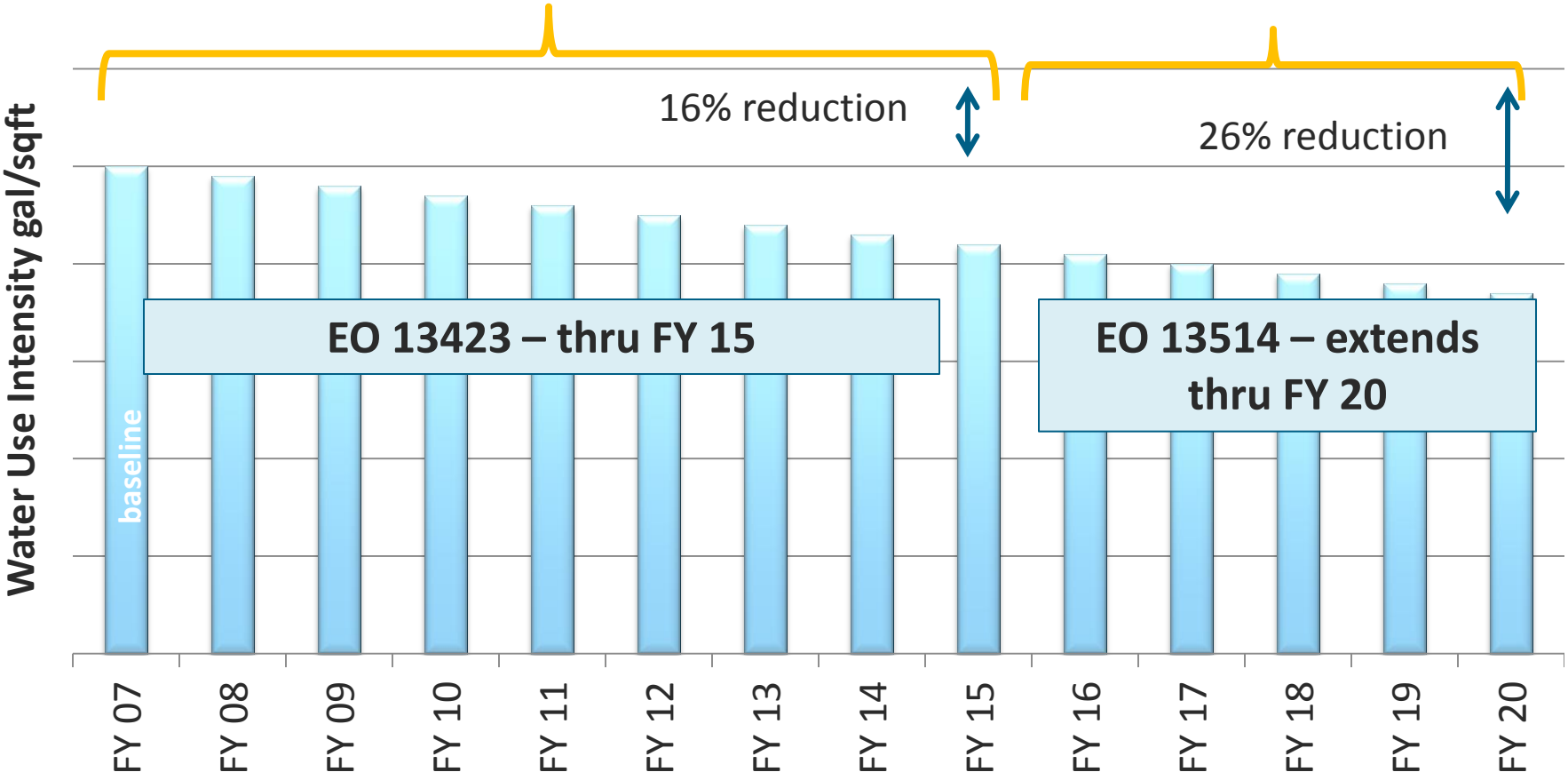
EO 13514 and Implementing Instructions

CEQ asked DOE/FEMP and EPA to lead an effort to develop guidance working with a pre-existing interagency water workgroup. Final guidance was released in July 2013.

- **Reduce Potable Water Intensity 2% per year**
- **Reduce ILA Water Use 2% per year**
- **Implement Water Reuse to reduce potable water consumption**
- **Follow EPA Stormwater Guidance**

Potable Water Intensity Reduction

Potable Water Use *Intensity* Reduction -- gallons/sqft
2% per year from FY 2007 through FY 2020



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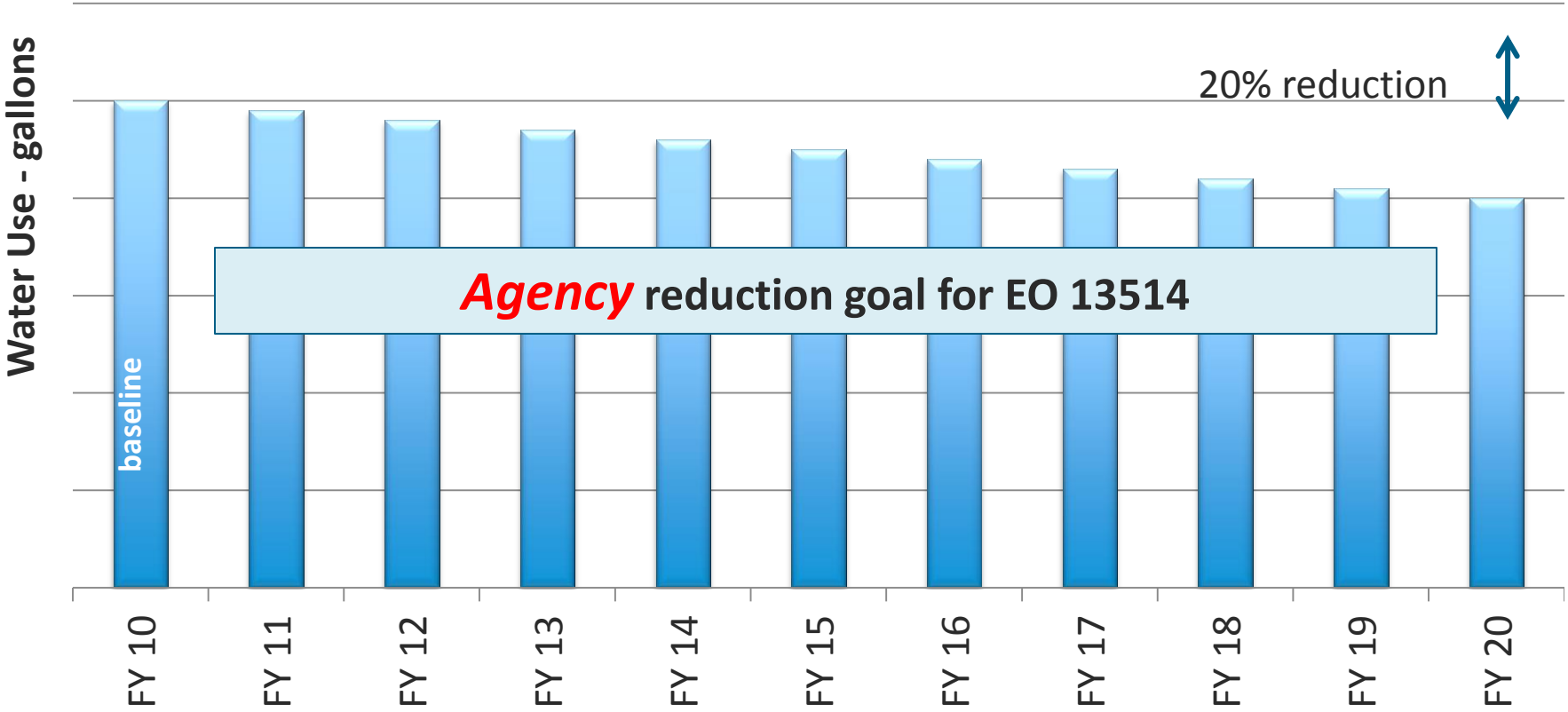
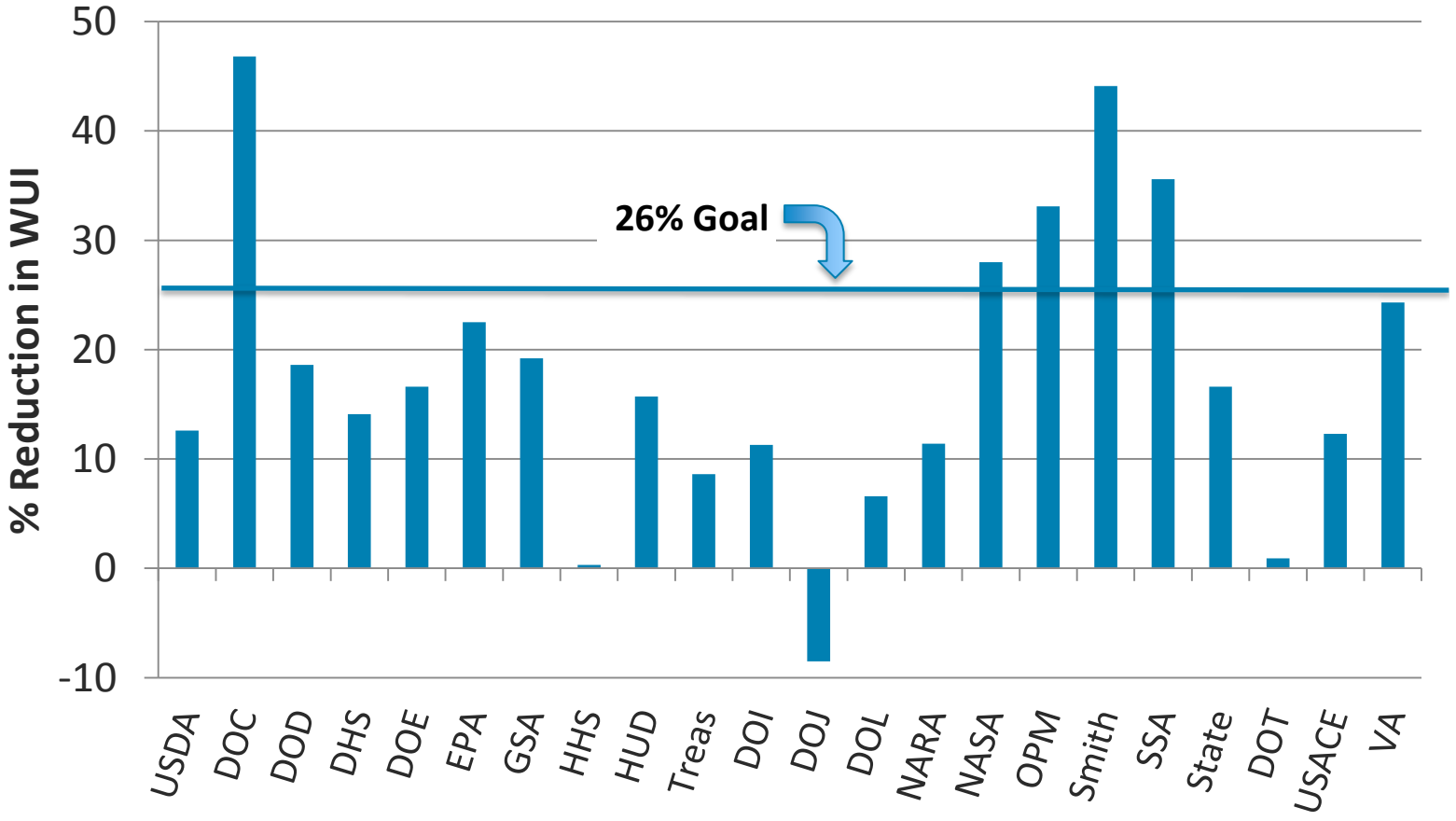
ILA Water Reduction

Industrial, Landscaping, and Agricultural *Volumetric* Water Reduction
2% per year from FY 2010 through FY 2020



Slide from Kate McMordie-Stoughton GreenGov 2011

Agency Potable Water Use Intensity Reductions (*Jan 2013 Scorecards*)



Federal government in total - 16.6% at the end of 2012

Implementing Instructions Section 2 – Introduction

The introduction includes a number of general principles that agencies are encouraged to consider as they address the requirements.

- Efficiency first – seek opportunities for efficiency before identifying new or alternative sources.
- Implement metering and sub-metering whenever feasible.
- Apply targets at agency level but identify opportunities for savings at sub-Agency or bureau level, e.g.,
  - Consider mission needs
  - Consider geographic availability of water (e.g. target water-scarce areas rather than water-rich)
- Ensure actions comply with all applicable laws, regulations or codes.

Section 3 – Definitions

Important to read the definitions because it helps to clarify what water uses are included under different types. Important terms defined include:

- Agricultural water
- Alternative water
- Facility
- Freshwater source
- Industrial water
- Landscaping water
- Non-consumptive water use
- Non-potable water
- Potable water
- Purchased reclaimed water
- Water reuse

Section 4 - E.O. Goals

- 4.1 Water uses covered by the EO. Some types are not covered, e.g.,
  - Water use in non-federal facilities on federal land or in facilities where federal gov't fully leases space and doesn't pay for water
  - Some non-consumptive uses such as fish hatcheries or in-stream uses
- 4.2 Potable water use intensity reductions – straightforward
  - Specifies potable water use (unlike EO 13423)
  - If ILA water use included in 2007 baseline and reporting, can continue to report in same way
- 4.3 ILA water use volume reductions
  - Pay attention to definitions of each use in Section 3

Section 4 - E.O. Goals

- 4.4 Unique ILA water uses
  - Discusses requirements for water uses that may be limited and where measuring or reducing may be difficult (e.g., wildlife watering stations)
- 4.5 Identify, Promote and Implement Water Reuse Strategies
  - Important to note that focus is on reducing potable water consumption, not non-potable water consumption.
  - Additional guidance provided in Section 6.
- 4.7 Implement and Achieve Stormwater Management Objectives
  - Directs reader to guidance developed for 2007 EISA

Remaining Sections

- Section 5 – Baselines
  - Section discusses approaches for determining baselines for metered and unmetered uses
  - Further guidance included in Appendix B and reader also referred to additional guidance developed by FEMP
    - Guidelines for Estimating Unmetered Landscaping Water Use
    - Guidelines for Estimating Unmetered Industrial Water Use

- Section 6 – Water Reuse and Alternative Water Sources
  - Section discusses treatment of different types of strategies
  - Guidance does not give credit for replacement of non-potable water sources with purchased reclaimed water
  - Appendix C provides examples of how to calculate potable and ILA water reductions from different types of water reuse strategies

Remaining Sections

- Section 7 – Implementing Water Efficiency Opportunities
  - Refers reader to different approaches and associated guidance to help implement improvements and carry out monitoring and verification
  - Reader may also want to refer to EO 13423 implementing guidance on financing improvements
- Section 8 – Reporting Requirements
  - Summarizes requirements to report via ***Annual GHG and Sustainability Data Report***
  - Next slides highlight some of the Portfolio Manager inputs related to reporting – some inputs have changed in new version of the tool

Adding a Water Meter in Portfolio Manager

look for WaterSense Meets EPA Criteria

Sample Facility

Not Available, Arlington, VA 22201 | Map It

Portfolio Manager Property ID: 2939186 | Primarily: Police Station

Year Built: 2001

Weather-Normalized Source EUI (kBtu/ft²)	
Current EUI:	N/A
Baseline EUI:	N/A

Summary | Details | Meters | Goals | Design

Energy & Water Consumption

Manage/Enter My Bills

Meters for Performance Metrics

View/Edit Configuration

Utility & Weather

Electric Distribution Utility (EDU):
Virginia Electric & Power Co [Dominion Resources Inc]

Regional Power Grid:
Virginia/Carolina

Energy Meters (1)

View as a Diagram

Add Another Meter

Name	Energy Type	Most Recen Bill Date	Action
Sample Meter	Electric - Grid	08/31/2011	I want to...

Water Meters (0)

View as a Diagram

Add Another Meter

You have not entered any water meters yet. After entering the meter, you will need to associate it in order to receive metrics.

Water Meter Input Fields

look for WaterSense Meets EPA Criteria

Your Property's Water Usage

How does your property use water? Please select all that apply.

- [x] Municipally Supplied Potable Water
  - [x] Indoor
    - How Many Meters? [ ]
  - [x] Outdoor
    - How Many Meters? [ ]
  - [x] All
    - How Many Meters? [ ]
- [x] Municipally Supplied Reclaimed Water
  - [ ] Indoor
  - [ ] Outdoor
  - [ ] All
- [x] Alternative Water Generated On-Site: [ ]
  - [ ] Indoor
  - [ ] Outdoor
  - [ ] All
- [x] Other: [ ]
  - [ ] Indoor
  - [ ] Outdoor
  - [ ] All

Guidance for Adding Water Use Data in Portfolio Manager

- Add meters based on the type of water measured:
  - Indoor, Outdoor or All (this is a meter that measures both indoor and outdoor)
  - Meter data should be additive. Example:
    - Total Municipally Supplied Potable Water = Indoor + Outdoor + All
    - Note: Indoor and Outdoor meters are not sub-meters of “All”
- Usage measured for “Other” meters should only include potable water use (e.g. well water)

How Water Meter Types Changed in the New Portfolio Manager

Old Meter Type	New Meter Type
Indoor	Municipally Supplied Potable Water – Indoor
Outdoor	Municipally Supplied Potable Water - Outdoor
Wastewater/Sewer	Other– All
Other	See chart below
Other "Notes" Field	Move this data "as is" into the Other "notes" field

If meter name contains:	New Meter Type
"fire"	Municipally Supplied Potable Water – Indoor
"irrigation"	Municipally Supplied Potable Water - Outdoor
"landscape"	Municipally Supplied Potable Water - Outdoor
"lawn"	Municipally Supplied Potable Water - Outdoor
"pool"	Municipally Supplied Potable Water - Outdoor
"well"	Other– All
"storm"	Other– All
"condensate"	Alternative Water Generated On-Site - All
"nonpotable"/"non-potable"	Municipally Supplied Reclaimed Water - All
"reclaim"	Municipally Supplied Reclaimed Water - All
Anything without a match	Municipally Supplied Potable Water - All

Guidance Documents

- **Executive Order Water Efficiency Implementing Instructions**
  - http://www.whitehouse.gov/sites/default/files/water_implementing_instructions.pdf.
- WaterSense BMPs and Federal Resources
  - www.epa.gov/watersense/commercial/docs/watersense_at_work
  - www.epa.gov/watersense/commercial/federal_agencies.html
- Dept. of Energy Federal Energy Management Program Resources
  - http://www1.eere.energy.gov/femp/program/waterefficiency.html
- EPA Stormwater and Green Infrastructure
  - http://www.epa.gov/oaintrnt/stormwater/
  - http://water.epa.gov/infrastructure/greeninfrastructure
- Water Reuse
  - EPA 2012 Water Reuse Guidelines - http://water.epa.gov/infrastructure/sustain/availability_wp.cfm
  - FEMP-Methodology for Use of Reclaimed Water at Federal Locations - http://www1.eere.energy.gov/femp/pdfs/reclaimed_water_use.pdf

FEMP Resources

General Water Efficiency for Federal Facilities

http://www1.eere.energy.gov/femp/program/waterefficiency.html

- Metering Requirements
  http://www1.eere.energy.gov/femp/program/om_metering.html
- Measurement and Verification Portal
  http://mnv.lbl.gov/keyMnVDocs/femp

EISA Guidance

- Energy and Water Evaluation Guidance
- Building Energy Use Benchmarking Guidance
- Guidance on Implementation & Follow-up of Identified Energy and Water Efficiency Measures
  - Federal Energy and Water Requirements Matrix
    http://www1.eere.energy.gov/femp/regulations/facility_cts.html

WaterSense, ENERGY STAR® and FEMP

- WaterSense, ENERGY STAR, and FEMP designated products complement each other to meet EO goals.

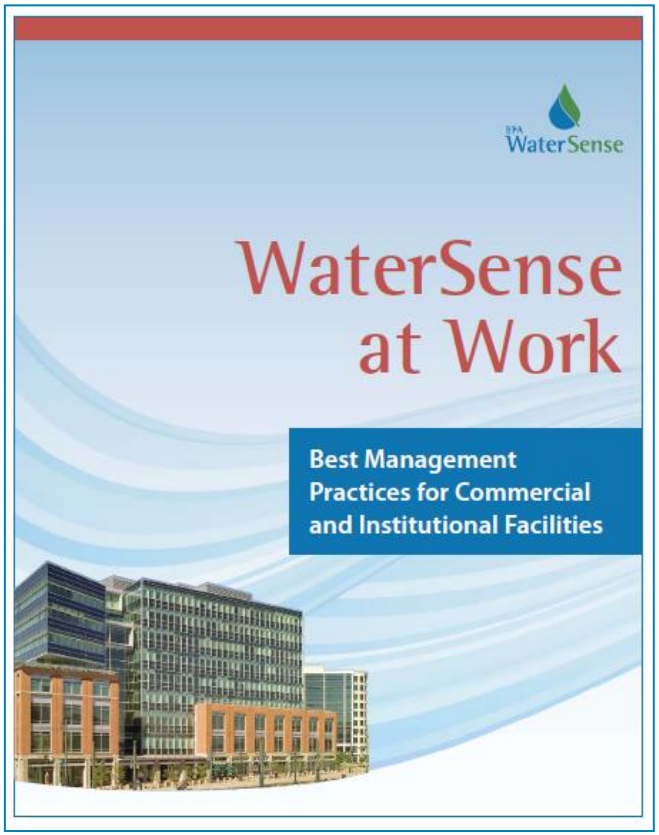
- Water factors are included in many ENERGY STAR qualified products
  - Ice machines
  - Steam cookers
  - Dishwashers
  - Clothes washers

- FEMP designates products in all categories, but defers to all final WaterSense and ENERGY STAR standards

  http://www1.eere.energy.gov/femp/technologies/eep_purchasingspecs.html

- Water and energy management planning guidelines aligned to be used together

Water Efficiency Best Management Practices



- Water management planning
- Water use monitoring and education
- Sanitary fixtures and equipment
- Commercial kitchen equipment
- Outdoor water use
- Mechanical systems
- Laboratory and medical equipment
- Onsite alternative sources of water

http://www.epa.gov/watersense/commercial

Water Efficiency Best Management Practices

- Each of 36 BMPs provides:
  - An overview of the technology
  - Operation, maintenance, and user education tips
  - Retrofit and replacement options
  - Calculations for potential water, energy, and dollar savings and payback
- 7 case studies outline success stories in major BMP areas

6.3 Cooling Towers

WaterSense

Overview

Cooling towers are used in a variety of commercial and institutional applications to remove excess heat. They serve facilities of all sizes, such as office buildings, schools, supermarkets, and large facilities, such as hospitals, office complexes, and university campuses. Cooling towers dissipate heat from recirculating water that is used to cool chillers, air conditioning equipment, or other process equipment. By design, they use significant amounts of water.

Cooling towers often represent the largest use of water in industrial and commercial applications, comprising 20 to 50 percent or more of a facility's total water use. However, facilities can save significant amounts of water by optimizing the operation and maintenance of cooling tower systems.[4]

Cooling towers

Cooling towers work by circulating a stream of water through systems that generate heat as they function. To cool the system, heat is transferred from the system to the water stream. This warm water is then pumped to the top of the cooling tower, where it is sprayed or dripped through internal fill (i.e., a labyrinth-like packing with a large surface area). Fans pull or push air through the tower in a counterflow, crossflow, or parallel flow to the falling water. As some of the water is evaporated, the heat is removed.[5] The remaining cooled water is recirculated back through the systems to repeat the process.

The thermal efficiency and longevity of the cooling tower and its associated water loops depend upon the proper management of water recirculated through the tower. Water leaves a cooling tower system in four ways: evaporation, blowdown or bleed-off, drift, and leaks or overflows.

Evaporation

Evaporation is the primary function of the tower and is the method that transfers heat from the cooling tower system to the environment. The quantity of evaporation is not typically targeted for water-efficiency efforts, because it controls the cooling process (although improving the energy efficiency of the systems that use the cooling water will reduce the evaporative load on the tower). The rate of evaporation from a cooling tower is typically equal to approximately 1 percent of the rate of

[4] North Carolina Department of Environment and Natural Resources, et al. May 2009. *Water Efficiency Manual for Commercial, Industrial and Institutional Facilities*. Page 39. savewaternc.org/fourthome.php.
[5] Ibid.

6-8 *WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities*

look for WaterSense Meets EPA Criteria

Table 1-4. Action Plan Water Use Reduction Opportunity Checklist

Water Use Reduction Opportunity/Project	Reference Section	Already Implemented	Evaluate/ Consider	Not Applicable
		4	4	4
Water Use Monitoring and Education				
Read water meters and record monthly water use.	2.2			
Install submeters on any major water-using equipment, systems, or processes.	2.2			
Implement a leak detection and repair program.	2.3			
Educate facility staff, building occupants, employees, and visitors on water management program goals and initiatives.	2.4			
Review, understand, and utilize information in codes, standards, and voluntary programs for water efficiency.	2.5			
Sanitary Fixtures and Equipment				
Replace old tank-type toilets with WaterSense labeled models.	3.2			
Replace old flushometer-valve-type toilets flushing greater than 1.6 gallons per flush (gpf) with high-efficiency models, and install retrofit dual-flush conversion devices on 1.6 gpf flushometer valve toilets.	3.2			
Replace old flushing urinals with WaterSense labeled models.	3.3			
Replace lavatory faucets or faucet aerators (for private use) with WaterSense labeled models and install 0.5 gallons per minute (gpm) faucets or aerators in public-use settings.	3.4			
Replace old showerheads with WaterSense labeled models.	3.5			
Wash only full loads of laundry.	3.6			
Replace old single-load clothes washers with ENERGY STAR qualified models or consider the water factor when purchasing larger or more industrial-sized laundry machines	3.6			
Commercial Kitchen Equipment				
Replace old ice machines with ENERGY STAR qualifie				
Replace old steam cookers with ENERGY STAR qual models.				
Load steam cookers, steam kettles, and combinati to capacity.				
Switch to connectionless combination ovens, stea ers, and steam kettles.				
Replace old water-cooled wok stoves with a waterl model.				
Install in-line flow restrictor to reduce dipper well f to 0.3 gpm.				

Checklists & Case Studies

Laboratory and Medical Equipment Case Study

To learn how Providence St. Peter Hospital in Olympia, Washington, saved 31 million gallons of water by installing water-efficient laboratory and medical equipment and implementing many additional best management practices described in *WaterSense at Work*, read the case study in Appendix A.